



Behavior 502

Smoke Reduction Strategies for Fire-Adapted Ecosystems

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The question is not if fire will occur in fire-adapted ecosystems, but when. With knowledge of the interaction between fuels, weather, firing techniques and ignition pattern, humans can harness this natural force to achieve resource objectives while at the same time minimizing deleterious side effects. For example, research on the contents, transport and dispersion of combustion products has resulted in evolving strategies to reduce emissions and manage smoke from prescription fires and still meet the objectives of wildland managers. Previous work has shown that smoke production is controlled by the amount, arrangement, and moisture content of the live and dead fuels consumed, rate of spread and residence time of the flame front, amount of smoldering combustion, season of the year, fire-return interval, and moisture content of the mixing layer. We present preliminary results from an ongoing cooperative study to improve methods for predicting emissions source strength for major US fuel types. Work was concentrated in the South during 1996 and 1997. Twenty-seven prescribed fires in Florida, Georgia, South Carolina and North Carolina were documented between January and May of 1996 with

ground-based instrumentation. During March and April, 1997, additional prescribed fires and several wild-fires were documented using both ground and airborne instrumentation. Information collected includes:

- live and dead fuel moisture content
- fuel consumption by fuel category
- fire behavior
- estimates of smoke production
- emissions production for both "first entry" fires and short-return-interval fires.

Emission factor models for primary pollutants have been developed as a function of combustion efficiency. This database is being used to test and refine existing emissions reduction strategies and improve inputs to dispersion models.

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